VAhyper®

Ready to catch the smallest element

voestalpine Tubulars GmbH & Co KG
www.voestalpine.com/tubulars

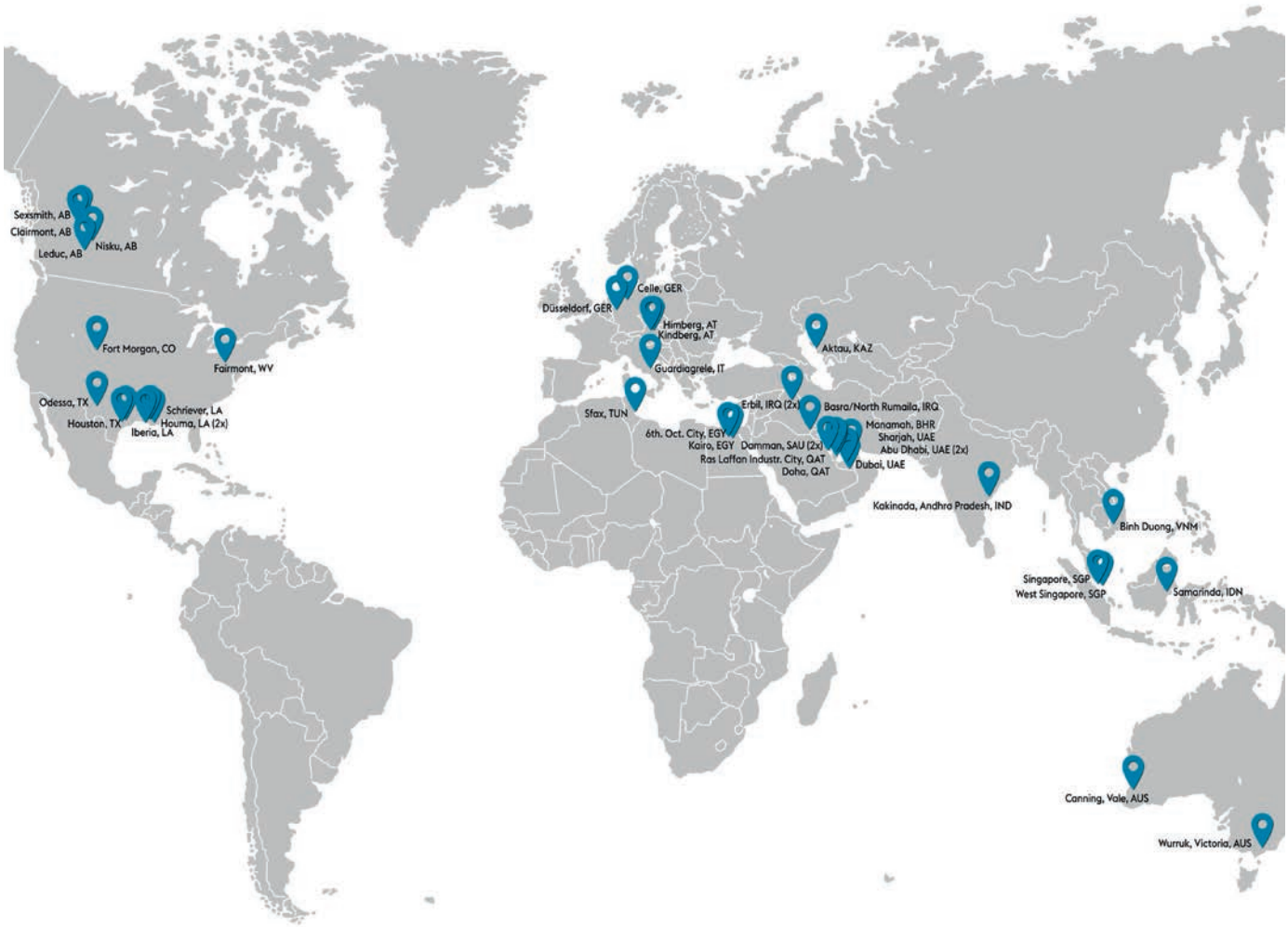
voestalpine
ONE STEP AHEAD.

PERFORMANCE IN TUBULARS

Our world is based on high tech seamless pipes that can withstand the toughest conditions, day in, day out. We promise highest performance based on the core values customization, innovation, sustainability and responsibility.

- CUSTOMIZATION
- INNOVATION
- SUSTAINABILITY
- RESPONSIBILITY

PRODUCTION, R&D, SALES LOCATIONS AND LICENSEES



Find your closest contact:
www.voestalpine.com/tubulars/en/Contact/sales/

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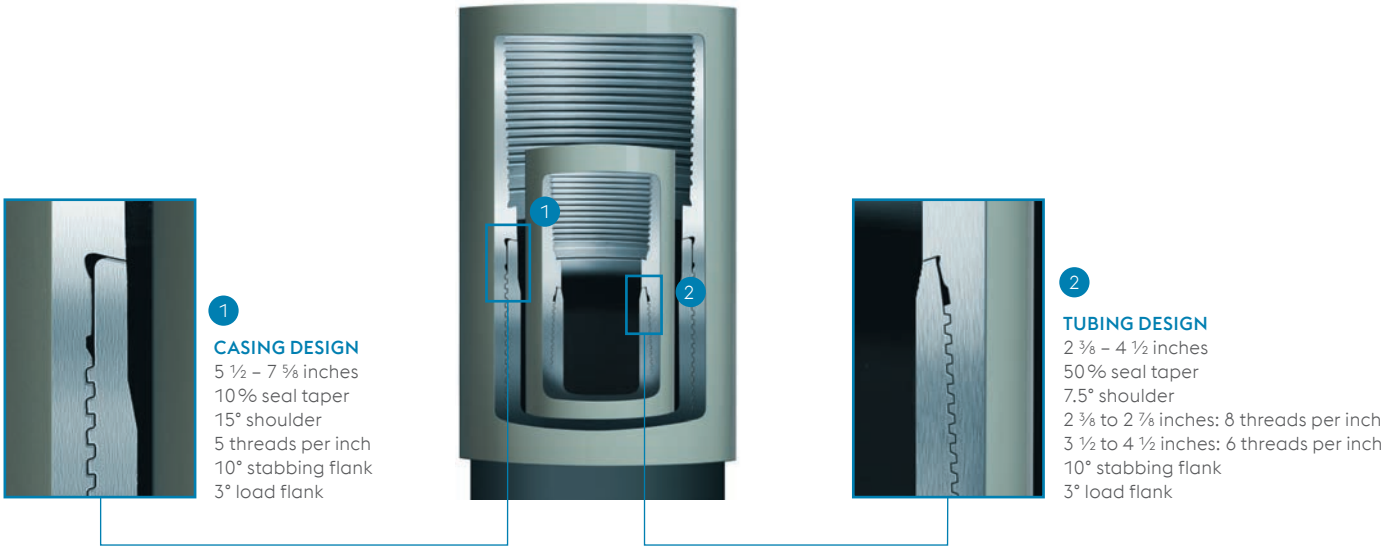
on social Media!


H2
HYDROGEN
ENERGY
STORAGE

DESIGN CHARACTERISTICS

voestalpine Tubulars Proprietary Connections like VAhyper® offer benefits which are not addressed by the API specification or exceed the API standards.



PRODUCT CHARACTERISTICS & CUSTOMER BENEFITS

METAL TO METAL SEAL
» ENSURES WELL INTEGRITY

The robust metal to metal seal design ensures hydrogen gas-tightness under combined loads at 100 % efficiency.

PROTECTIVE DESIGN
» PREVENTS YOU FROM UNEXPECTED COSTS

The seal area to pin face distance provides protection against transport, handling and installation damages.

The recess before and after the seal area is a lubricant reservoir preventing pressure build-up by excess thread compound.

HYDROGEN-TIGHTNESS
» MINIMIZES RISKS

Improved sealing performance due to special surface treatment at seal area.

SAFE & RELIABLE
» FIT-FOR-PURPOSE

The connection performance is laboratory tested and field proven in various hydrogen underground storage projects.

Beyond that, VAhyper® has been successfully tested according to an in-house developed fit-for-purpose test protocol for hydrogen-tightness with 100 % H_2 at high pressures (in cooperation with an Austrian Hydrogen Research Center).

The general gas-tightness is approved by ISO 13679 CAL IV.

GRADES
» TAILOR-MADE CASING & TUBING GRADES

VAhyper® in combination with H_2 grades, e.g. VA-H2-L80 and VA-H2-J55, ensures improved resistance against hydrogen embrittlement.

These grades are qualified according to actual test methods for materials with resistance against molecular hydrogen environment (dry gas and wet conditions), e.g. constant load tests and slow strain rate test.

Other grades available upon request.

REFERENCE PROJECT

VAhyper® – The product of choice for hydrogen underground storage operations worldwide

Project key data	
Location	Netherlands, Europe
Application	A pure hydrogen storage project
String Length	6,070 ft (1.85 km)
Material used	4 ½" x 12,60 ppf VA-H2-L80 VAhyper®

VAhyper®

Companies involved in the transport and storage of hydrogen approached voestalpine Tubulars to develop a product solution for their hydrogen applications. The reasons: they were searching for a partner who can provide safe and reliable product solutions, who has the essential know-how regarding threaded pipe connections and steel grades and who has the testing capabilities to design the optimal product solution in a timely manner. All these parameters are a prerequisite for safe handling with hydrogen in anyway.

With its long-term experience in connection development and manufacturing for the oil and gas industry, its certified quality, safety and numerous other management systems, its experience in steel and tube production, its on-site R&D team and testing facilities, voestalpine Tubulars met all these conditions.

voestalpine Tubulars transferred its know-how from decades of product development and experience within the oil & gas segment to develop **VAhyper®, the hydrogen-tight Premium Connection**, increasing safety for hydrogen applications.

6,070 ft of 4 ½" x 12,60 ppf Tubing with VAhyper® premium connections had been used for a pure hydrogen storage project in the Netherlands in Europe in 2021/22, where the first snubbing operations (removal of tubing from a pressurized well-bore) worldwide had been performed successfully with 100 % hydrogen.

The first pipes shipped to the customers withstood hydrogen storage pressures of 2,900 psi (200 bar) over a long period of time at field conditions. In addition, the pipe connection VAhyper® had been tested successfully according to a fit-for-purpose test protocol for hydrogen-tight premium connections, which includes the verification of hydrogen-tightness by tests with 100 % hydrogen gas up to 10,150 psi (700 bar).

Beside a hydrogen-tight premium connection, also **a tailor-made steel grade for hydrogen applications** was needed. For current demands, **VA-H2-L80** was the solution of choice and tested against susceptibility to hydrogen embrittlement in gaseous atmosphere and in more severe aqueous near-reality test solutions, both up to 150 bar H_2 partial pressure – meanwhile, we are able to carry out tests up to 1000 bar. Additionally, an immersion specimen for testing the hydrogen uptake was implemented under these environments. Further grades up to higher material strength levels are available and will be tailored to the characteristics of the specific application.

To complete the product range, the **line pipe grades L360N or X52N and L360Q or X52Q** were tested for hydrogen resistance up to 1000 bar gas pressure. The complete welding system – base material, weld seam and heat-affected zone – have been investigated with positive results. Hence, we can also offer a **tailor-made solution for distribution lines**.

Besides that, further H_2 underground projects were realized with our premium connection VAhyper® and VA-H2 material grades. Further information is available upon request.


600K
BPC
BPC
BPC
BPC
BPC

DIMENSIONS

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		INSIDE DIAMETER		DRIFT DIAMETER	
inch	mm	lb/ft	kg/m	inch	mm	inch	mm	inch	mm
2 ⅜	60.32	4.60	6.69	0.190	4.83	1.995	50.66	1.901	48.29
		5.10	7.57	0.218	5.54	1.939	49.24	1.845	46.86
2 ⅞	73.02	6.40	9.29	0.217	5.51	2.441	62.00	2.348	59.64
		7.80	11.57	0.276	7.01	2.323	59.00	2.230	56.64
		8.60	12.74	0.308	7.82	2.259	57.38	2.166	55.02
3 ½	88.90	9.20	13.29	0.254	6.45	2.992	76.00	2.867	72.82
		10.20	14.97	0.289	7.34	2.922	74.22	2.797	71.04
		12.70	18.90	0.375	9.52	2.750	69.86	2.625	66.68
4 ½	114.30	12.60	18.50	0.271	6.88	3.958	100.54	3.833	97.36
		13.50	19.78	0.290	7.37	3.920	99.56	3.794	96.37
		15.20	22.67	0.337	8.56	3.826	97.18	3.701	94.01
5 ½	139.70	17.00	25.73	0.304	7.72	4.892	124.26	4.767	121.08
		20.00	30.12	0.361	9.17	4.778	121.36	4.653	118.18
		23.00	34.17	0.415	10.54	4.670	118.62	4.545	115.44
		26.00	38.65	0.476	12.09	4.548	115.52	4.423	112.34
		26.80	40.35	0.500	12.70	4.500	114.30	4.375	111.13
7	177.80	23.00	34.68	0.317	8.05	6.366	161.70	6.241	158.52
		26.00	39.20	0.362	9.19	6.276	159.42	6.151	156.24
		29.00	43.77	0.408	10.36	6.184	157.08	6.059	153.90
7 ⅝	193.68	26.40	39.64	0.328	8.33	6.969	177.01	6.84	173.840
		29.70	44.82	0.375	9.53	6.875	174.63	6.75	171.450
		33.70	50.79	0.430	10.92	6.765	171.83	6.64	168.660
		39.00	58.25	0.500	12.70	6.625	168.28	6.50	165.100
		42.80	64.68	0.562	14.27	6.501	165.13	6.38	161.950

All VAhyper® accessories are available on request. The values shown are based on T&C pipe lengths of L = 10.0m (32.81ft).
Special clearance couplings with reduced outside diameters are available on request.
Blanking dimensions for accessories are available as a download on our web page www.voestalpine.com/tubulars

COUPLING LENGTH		OUTSIDE DIAMETER COUPLING		VOLUME				MAKE UP LOSS	
				DISPLACEMENT		PRODUCTION			
inch	mm	inch	mm	us gal/ft	lit/m	us gal/ft	lit/m	inch	mm
5.748	146.00	2.776	70.50	0.231	2.87	0.163	2.02	2.256	57.30
5.748	146.00	2.776	70.50	0.231	2.87	0.154	1.91	2.256	57.30
6.378	162.00	3.248	82.50	0.338	4.20	0.243	3.02	2.551	64.80
6.378	162.00	3.406	86.50	0.339	4.21	0.220	2.73	2.551	64.80
6.378	162.00	3.406	86.50	0.339	4.21	0.209	2.59	2.551	64.80
7.323	186.00	4.000	101.60	0.502	6.23	0.366	4.54	3.043	77.30
7.323	186.00	4.000	101.60	0.502	6.23	0.349	4.33	3.043	77.30
7.323	186.00	4.114	104.50	0.502	6.24	0.308	3.83	3.043	77.30
8.661	220.00	4.902	124.50	0.829	10.30	0.639	7.94	3.693	93.80
8.661	220.00	5.000	127.00	0.830	10.31	0.627	7.79	3.693	93.80
8.661	220.00	5.000	127.00	0.830	10.31	0.597	7.42	3.693	93.80
9.843	250.00	6.051	153.70	1.241	15.41	0.976	12.13	4.313	109.56
9.843	250.00	6.051	153.70	1.241	15.41	0.931	11.57	4.313	109.56
9.843	250.00	6.300	160.02	1.243	15.45	0.890	11.05	4.313	109.56
9.843	250.00	6.300	160.02	1.243	15.45	0.844	10.48	4.313	109.56
9.843	250.00	6.300	160.02	1.243	15.45	0.826	10.26	4.313	109.56
10.630	270.00	7.657	194.50	2.010	24.96	1.654	20.54	4.707	119.56
10.630	270.00	7.657	194.50	2.010	24.96	1.607	19.96	4.707	119.56
10.630	270.00	7.657	194.50	2.010	24.96	1.560	19.38	4.707	119.56
11.024	280.00	8.500	215.90	2.388	29.66	1.982	24.61	4.908	124.66
11.024	280.00	8.500	215.90	2.388	29.66	1.928	23.95	4.908	124.66
11.024	280.00	8.500	215.90	2.388	29.66	1.867	23.19	4.908	124.66
11.024	280.00	8.500	215.90	2.388	29.66	1.791	22.24	4.908	124.66
11.024	280.00	8.500	215.90	2.388	29.66	1.725	21.42	4.908	124.66

PERFORMANCE PROPERTIES TUBING

(METRIC UNITS)

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		GRADE 55				GRADE 80			
						P_i	P_c	S_y	L	P_i	P_c	S_y	L
inch	mm	lb/ft	kg/m	inch	mm	MPa		kN		MPa		kN	
2 ⅜	60.32	4.60	6.69	0.190	4.83	53.10	55.80	320	310	77.40	81.20	460	450
		5.10	7.57	0.218	5.54	60.90	63.20	360	310	88.70	92.00	530	450
2 ⅞	73.02	6.40	9.29	0.217	5.51	50.00	53.00	440	330	72.90	76.90	650	480
		7.80	11.57	0.276	7.01	63.70	65.80	550	530	92.70	95.70	800	770
		8.60	12.74	0.308	7.82	71.00	72.60	610	530	103.50	105.60	880	770
3 ½	88.90	9.20	13.29	0.254	6.45	48.10	51.00	630	590	70.10	72.60	920	870
		10.20	14.97	0.289	7.34	54.80	57.40	710	590	79.80	83.60	1040	870
		12.70	18.90	0.375	9.52	71.00	72.60	900	770	103.40	105.60	1310	1130
4 ½	114.30	12.60	18.50	0.271	6.88	39.90	39.40	880	570	58.10	51.70	1280	820
		13.50	19.78	0.290	7.37	42.80	44.30	940	750	62.30	58.90	1370	1100
		15.20	22.67	0.337	8.56	49.70	52.50	1080	750	72.30	76.50	1570	1100

P_i ... internal yield pressure | P_c ... collapse resistance | S_y ...joint yield strength | L...load on coupling face
Other Grades on request. | Performance properties for proprietary and other grades or for special clearance couplings on request.

(US CUSTOMARY-UNITS)

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		GRADE 55				GRADE 80			
						P_i	P_c	S_y	L	P_i	P_c	S_y	L
inch	mm	lb/ft	kg/m	inch	mm	psi		1000lb		psi		1000lb	
2 ⅜	60.32	4.60	6.69	0.190	4.83	7700	8100	72	70	11230	11780	103	101
		5.10	7.57	0.218	5.54	8830	9170	81	70	12860	13340	119	101
2 ⅞	73.02	6.40	9.29	0.217	5.51	7250	7680	99	74	10570	11160	146	108
		7.80	11.57	0.276	7.01	9240	9540	124	119	13440	13880	180	173
		8.60	12.74	0.308	7.82	10300	10530	137	119	15010	15310	198	173
3 ½	88.90	9.20	13.29	0.254	6.45	6980	7400	142	133	10170	10530	207	196
		10.20	14.97	0.289	7.34	7950	8330	160	133	11570	12120	234	196
		12.70	18.90	0.375	9.52	10300	10530	202	173	15000	15310	294	254
4 ½	114.30	12.60	18.50	0.271	6.88	5790	5720	198	128	8430	7500	288	184
		13.50	19.78	0.290	7.37	6210	6420	211	169	9040	8540	308	247
		15.20	22.67	0.337	8.56	7210	7620	243	169	10490	11090	353	247

P_i ... internal yield pressure | P_c ... collapse resistance | S_y ...joint yield strength | L...load on coupling face
Other Grades on request. | Performance properties for proprietary and other grades or for special clearance couplings on request.

PERFORMANCE PROPERTIES CASING

(METRIC UNITS)

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		GRADE 55				GRADE 80			
						P_i	P_c	S_y	L	P_i	P_c	S_y	L
inch	mm	lb/ft	kg/m	inch	mm	MPa		kN		MPa		kN	
5 ½	139.70	17.00	25.73	0.304	7.72	36.70	33.90	1210	810	53.40	43.40	1770	1180
		20.00	30.12	0.361	9.17	43.50	45.60	1430	810	63.40	60.90	2080	1180
		23.00	34.17	0.415	10.54	50.00	53.00	1620	1390	72.90	76.90	2360	2030
		26.00	38.65	0.476	12.09	57.40	60.00	1840	1390	83.60	87.20	2680	2030
		26.80	40.35	0.500	12.70	60.30	62.70	1920	1390	87.80	91.10	2800	2030
7	177.80	23.00	34.68	0.317	8.05	30.00	22.50	1630	1320	43.70	26.40	2370	1930
		26.00	39.20	0.362	9.19	34.30	29.80	1840	1320	49.90	37.30	2690	1930
		29.00	43.77	0.408	10.36	38.60	37.30	2070	1320	56.30	48.40	3010	1930
7 ⅝	193.68	26.40	39.64	0.328	8.33	28.50	19.90	1840	2290	41.50	23.40	2680	3340
		29.70	44.82	0.375	9.53	32.60	27.00	2090	2290	47.50	33.00	3040	3340
		33.70	50.79	0.430	10.92	37.40	35.20	2380	2290	54.50	45.20	3460	3340
		39.00	58.25	0.500	12.70	43.50	45.60	2740	2290	63.30	60.80	3980	3340
		42.80	64.68	0.562	14.27	48.90	51.80	3050	2290	71.20	74.50	4440	3340

P_i ... internal yield pressure | P_c ... collapse resistance | S_y ...joint yield strength | L...load on coupling face
Other Grades on request. | Performance properties for proprietary and other grades or for special clearance couplings on request.

(US CUSTOMARY-UNITS)

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		GRADE 55				GRADE 80			
						P_i	P_c	S_y	L	P_i	P_c	S_y	L
inch	mm	lb/ft	kg/m	inch	mm	psi		1000lb		psi		1000lb	
5 ½	139.70	17.00	25.73	0.304	7.72	5320	4910	272	182	7750	6290	398	265
		20.00	30.12	0.361	9.17	6310	6610	321	182	9200	8830	467	265
		23.00	34.17	0.415	10.54	7250	7680	364	313	10570	11160	531	456
		26.00	38.65	0.476	12.09	8330	8700	414	313	12130	12650	601	456
		26.80	40.35	0.500	12.70	8750	9090	432	313	12730	13220	628	456
7	177.80	23.00	34.68	0.317	8.05	4350	3270	366	297	6340	3830	533	434
		26.00	39.20	0.362	9.19	4970	4320	414	297	7240	5410	605	434
		29.00	43.77	0.408	10.36	5600	5410	465	297	8170	7020	676	434
7 ⅝	193.68	26.40	39.64	0.328	8.33	4130	2890	414	515	6020	3400	602	751
		29.70	44.82	0.375	9.53	4730	3910	470	515	6890	4790	683	751
		33.70	50.79	0.430	10.92	5420	5100	535	515	7900	6560	778	751
		39.00	58.25	0.500	12.70	6310	6610	616	515	9180	8820	895	751
		42.80	64.68	0.562	14.27	7090	7510	686	515	10330	10810	998	751

P_i ... internal yield pressure | P_c ... collapse resistance | S_y ...joint yield strength | L...load on coupling face
Other Grades on request. | Performance properties for proprietary and other grades or for special clearance couplings on request.

MAKE UP TORQUE

RECOMMENDED OPTIMUM MAKE-UP TORQUE FOR REGULAR COUPLINGS

PIPE OUTSIDE DIAMETER		NOMINAL WEIGHT		WALL THICKNESS		GRADE 55		GRADE 80	
inch	mm	lb/ft	kg/m	inch	mm	Nm	ft.lb	Nm	ft.lb
2 ⅜	60.32	4.60	6.69	0.190	4.83	1300	960	1550	1140
		5.10	7.57	0.218	5.54	1380	1020	1640	1210
2 ⅞	73.02	6.40	9.29	0.217	5.51	2090	1540	2630	1940
		7.80	11.57	0.276	7.01	2900	2140	3670	2710
		8.60	12.74	0.308	7.82	3160	2330	4010	2960
3 ½	88.90	9.20	13.29	0.254	6.45	2940	2170	3540	2610
		10.20	14.97	0.289	7.34	3130	2310	3730	2750
		12.70	18.90	0.375	9.52	4080	3010	5140	3790
4 ½	114.30	12.60	18.50	0.271	6.88	4010	2960	4940	3640
		13.50	19.78	0.290	7.37	4340	3200	5530	4080
		15.20	22.67	0.337	8.56	5000	3690	6430	4740
5 ½	139.70	17.00	25.73	0.304	7.72	7670	5660	9570	7060
		20.00	30.12	0.361	9.17	8470	6250	10580	7800
		23.00	34.17	0.415	10.54	8730	6440	10790	7960
		26.00	38.65	0.476	12.09	8990	6630	11090	8180
		26.80	40.35	0.500	12.70	9110	6720	11470	8460
7	177.80	23.00	34.68	0.317	8.05	11000	8110	14070	10380
		26.00	39.20	0.362	9.19	12070	8900	15480	11420
		29.00	43.77	0.408	10.36	12360	9120	15780	11640
7 ⅝	193.68	26.40	39.64	0.328	8.33	10260	7570	13410	9890
		29.70	44.82	0.375	9.53	12760	9410	16610	12250
		33.70	50.79	0.430	10.92	14140	10430	18280	13480
		39.00	58.25	0.500	12.70	17370	12810	22150	16340
		42.80	64.68	0.562	14.27	17770	13110	22570	16650

This table shows the values at printing date of this brochure. Actual values available in the Datasheet Generator on our Web Page or in the myTubulars App.

Recommended make-up-torque using a thread compound with a friction factor of 1.0.

2 ⅜ inches:
Maximum torque: optimum +5%
Minimum torque: optimum -5%

All other sizes:
Maximum torque: optimum + 10 %
Minimum torque: optimum – 10 %


H2
Hydrogen H2
zero emission

SERVICES

myTubulars

myTubulars APP
PRODUCT DATASHEETS, FIELD SERVICE AND LICENSEES

Generate datasheets and load envelopes containing dimension and performance data for products provided by voestalpine Tubulars with our Datasheet Generator. You can quickly and easily check the product application against field requirements in advance also on your tablet or smartphone by using the myTubulars App.

myTubulars is available for all iOS and Android devices for free in the App stores.

GET THE APP!

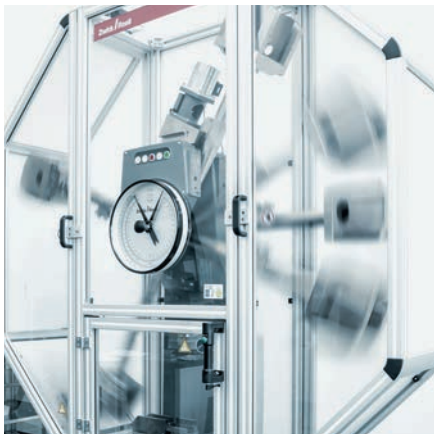
Download on the App Store

GET IT ON Google Play

Field Service during the installation can be provided upon request. Please visit the Customer Service site on our web page www.voestalpine.com/tubulars

WHY voestalpine Tubulars?

Support from material and product selection, in-house material and product development, to final product and installation consulting from one source.



PRODUCT DEVELOPMENT

CONNECTION DEVELOPMENT

MATERIAL DEVELOPMENT

PROCESS DEVELOPMENT

TAILOR-MADE SOLUTIONS

FIELD SERVICE

VAhyper®/EDITION 2025/04/01

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ONE STEP AHEAD.